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EXAMINER

TRAN, CON P

ART UNIT PAPER NUMBER

2615

DATE MAILED: 05/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/577,649

Applicant(s)

TREURNIET ET AL.

Examiner

Con P. Tran

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 21 February 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. **Claims 1-2, 5, 7, 9-10, 13-14** are rejected under 35 U.S.C. 103(a) as being unpatentable over Colomes et al. ("A Perceptual Model Applied to Audio Bit-Rate Reduction", J. Audio Eng. Soc. Vol. 43, pp233-240, April 1995), cited by Applicants (hereinafter, "Colomes") in view of Beerends ("Measuring the Quality of Speech and Music Codecs, an Integrated Psychoacoustic Approach", Proceedings of the Audio Engineering Society, Copenhagen, Denmark, Reprint Number 4154, 1996), cited by Applicants.

Regarding **claim 9**, Colomes teaches a system for determining an objective audio quality measurement of a target audio signal, comprising:

a peripheral ear processor (artificial ear) for processing a reference audio signal (i.e., minimum masking curve level) and a target audio signal (i.e., maximum audio signal level) to provide a reference basilar sensation signal and a target basilar

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sensation signal, respectively (page 238, left column, pars. 3-5; page 234, left column, pars. 2, 3, right column, par. 2);

a comparator for comparing the reference basilar sensation signal and the target basilar sensation signal to determine a basilar degradation signal (calculate the difference; page 238, left column, pars. 5,6); and

a cognitive processor for processing the basilar degradation signal to determine a plurality of cognitive model components (i.e., excitation curves, excitation values, page 235, right column; spectral bandwidth 1 bark wide, page 236, right column) for providing an objective perceptual quality rating (using spreading function, page 235, left column, last paragraph - page 235, right column, second paragraph; page 234, left column, pars 4,5) quantifying the perceptual difference between the reference audio signal and the target audio signal (determining how much degradation based on threshold and probability of basilar representation of both signals, e.g., difference limen, then modifying probability  $P_i$ , page 236, left column).

However, Colomes does not explicitly disclose the perceptual difference is in acoustic quality.

Beerends discloses measuring the quality of speech and music codecs in which including cognitive model (Fig. 2) to quantify the perceptual difference in acoustic quality (i.e., audible distortion; page 7, lines 2-32).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated a cognitive model of Beerends teaching with Colomes artificial ear model so that to quantify the perceptual difference in acoustic

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quality as claimed for purpose of being possible to predict quality of codecs, as suggested by Beerends in page 4, lines 20-22).

Regarding **claim 10**, Colomes teaches a system according to claim 9, wherein the a plurality of cognitive model components (i.e., excitation curves, excitation values, page 235, right column; spectral bandwidth 1 bark wide, page 236, right column) is selected from coefficient of variation of distortion (i.e. upper slope; page 235, left column, last paragraph - page 235, right column, second paragraph).

Regarding **claim 13**, Colomes teaches a system according to claim 9, wherein the cognitive processor includes pre-processing means for determining effects of at least one of perceptual inertia, perceptual asymmetry (page 237, left column, second paragraph) and adaptive threshold (i.e., below a threshold  $\sigma$ , there will be no detection (page 236, left column, first paragraph)).

Regarding **claim 14**, Colomes teaches a system according to claim 9, wherein the peripheral ear processor includes a recursive filter (low pass filter in [8], i.e., autoregressive filter in Paillard et al., page 24, right column, prior art in record; see Colomes page 234, right column, paragraph 2).

Regarding claims **1, 2, 7, and 5**, these claims merely reflect the process to the apparatus claim of claims 9, 10, 13, and 14, respectively and are therefore rejected for the same reasons.

3. **Claims 3 and 11** are rejected under 35 U.S.C. 103(a) as being unpatentable over Colomes et al. ("A Perceptual Model Applied to Audio Bit-Rate Reduction", J. Audio Eng. Soc. Vol. 43, pp233-240, April 1995, cited by Applicants (hereinafter, "Colomes") in view of Beerends ("Measuring the Quality of Speech and Music Codecs, an Integrated Psychoacoustic Approach", Proceedings of the Audio Engineering Society, Copenhagen, Denmark, Reprint Number 4154, 1996), cited by Applicants, and further in view of Hunt U.S. Patent 5,809,453.

Regarding **claim 11**, Colomes in view of Beerends teaches a system according to claim 9. Colomes further discloses using threshold and power density spectrum in detecting tone input. However, Colomes in view of Beerends does not explicitly disclose wherein the peripheral ear processor further provides a harmonic structure from an error spectrum obtained through a comparison of the reference and target audio signals.

Hunt discloses method and apparatus for detecting harmonic structure in a waveform (col. 1, lines 7-11).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated a method and apparatus for detecting harmonic structure of Hunt with artificial ear model of Colomes in view of Beerends for

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purpose of determining an estimate of the periodicity of the wave form, as suggested by Hunt in column 2, lines 54-55).

Regarding **claim 3** this claim merely reflects the process to the apparatus claim of claim 11, and is therefore rejected for the same reasons.

4. **Claims 4, 6, 12 and 15** are rejected under 35 U.S.C. 103(a) as being unpatentable over Colomes et al. ("A Perceptual Model Applied to Audio Bit-Rate Reduction", J. Audio Eng. Soc. Vol. 43, pp233-240, April 1995, cited by Applicants (hereinafter, "Colomes") in view of Beerends ("Measuring the Quality of Speech and Music Codecs, an Integrated Psychoacoustic Approach", Proceedings of the Audio Engineering Society, Copenhagen, Denmark, Reprint Number 4154, 1996), cited by Applicants, and further in view of Hollier U.S. Patent 5,621,854.

Regarding **claim 12**, Colomes in view of Beerends teaches a system according to claim 9. However, Colomes in view of Beerends does not explicitly disclose wherein the cognitive processor includes a multi-layer neural network.

Hollier teaches method and apparatus for objective speech quality measurement (Title) in which an analysis unit (8, Fig. 2) having outputs being combined by processing of a neural network (col. 11, line 59 – col. 12, line 12).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated a neural network of Hollier with artificial ear

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model of Colomes in view of Beerends for purpose of providing a signal indicating the perceptual significance of the distortion in the signal, as suggested by Hollier in column 12, lines 8-9).

Regarding **claim 15**, Hollier further teaches a system according to claim 9, wherein the cognitive processor includes weighting means for adjacent frequency ranges (col. 9, lines 5-31; Fig. 9).

Regarding claims **4 and 6**, these claims merely reflect the process to the apparatus claim of claims 12 and 15 and are therefore rejected for the same reasons.

5. **Claims 8 and 16** are rejected under 35 U.S.C. 103(a) as being unpatentable over Colomes et al. ("A Perceptual Model Applied to Audio Bit-Rate Reduction", J. Audio Eng. Soc. Vol. 43, pp233-240, April 1995, cited by Applicants (hereinafter, "Colomes") in view of Beerends ("Measuring the Quality of Speech and Music Codecs, an Integrated Psychoacoustic Approach", Proceedings of the Audio Engineering Society, Copenhagen, Denmark, Reprint Number 4154,1996), cited by Applicants, and further in view of International Telecommunication Union- Radiocommunication Sector BS.1387 (1998) (hereinafter, "ITU-R BS 1387").

Regarding **claim 16**, Colomes in view of Beerends teaches a system according to claim 9. However, Colomes in view of Beerends does not explicitly disclose wherein the cognitive processor includes adjustment means for adjusting the basilar degradation



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signal according to a variance of auditory filter envelope modulation rates of the reference audio signal.

ITU-R BS.1387 teaches an objective measurement of perceived audio quality in which a cognitive processor includes adjustment means for adjusting the basilar degradation signal according to a variance of auditory filter envelope modulation rates of the reference audio signal (Table 4, pages 13-14; page 16, paragraph 7).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated an objective measurement of perceived audio quality of ITU-R BS.1387 with a perceptual model of Colomes in view of Beerends for purpose of providing an accurate model of a peripheral auditory system as well as cognitive aspects of audio quality judgment, as suggested by ITU-R BS.1387 in page 15, paragraph 3.

**Regarding claim 8**, this claim merely reflects the process to the apparatus claim of claim 16 and is therefore rejected for the same reason.

### ***Response to Arguments***

6. Applicants' arguments filed February 21, 2006 regarding claims 1-16 have been fully considered but they are moot in view of new grounds of rejection.

7. **NOTE:** The Art Unit location of your application in the USPTO has changed. To aid in correlating any papers for this application, all further correspondence regarding this application should be directed to Art Unit 2615

***Conclusion***

8. Applicant's amendment necessitated the new grounds of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Con P. Tran whose telephone number is (571) 272-7532. The examiner can normally be reached on M - F (8:30 AM - 5:00 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor Vivian C. Chin can be reached on (571) 272-7848. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for

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published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

cpt *CRJ*  
May 5, 2006

  
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SUPERVISORY PATENT EXAMINER  
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